# Subsea PowerDrill
## User's Manual

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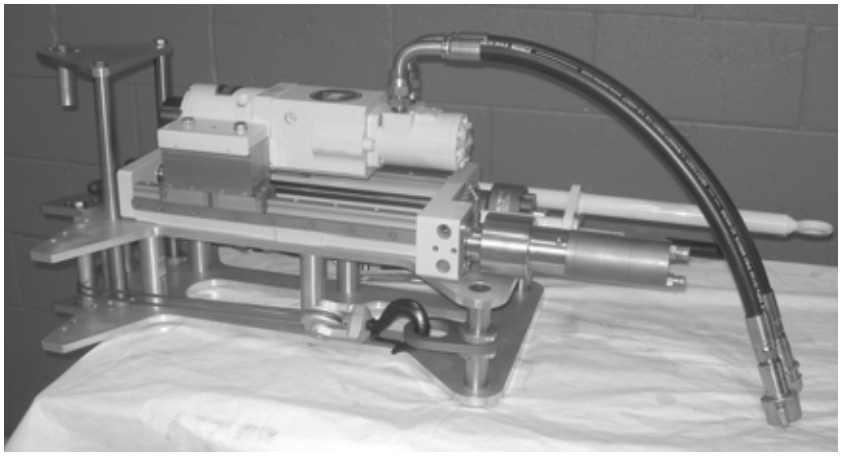

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# Chapter 1

# About the Subsea PowerDrill

**In This Chapter**

PURPOSE OF THIS MANUAL

HOW TO USE THE MANUAL

SYMBOLS AND WARNINGS

MANUAL UPDATES AND REVISION TRACKING

EQUIPMENT DESCRIPTION

## PURPOSE OF THIS MANUAL

This manual explains how to operate and maintain the hydraulic Subsea PowerDrill. It includes instructions for set-up, operation, and maintenance. It also contains parts lists, diagrams, and service information to help you order replacement parts and perform user-serviceable repairs.

Before operating the Subsea PowerDrill, you should read through this manual and become familiar with all instructions.

## HOW TO USE THE MANUAL

This manual is organized to help you quickly find the information you need. Each chapter describes a specific topic on using or maintaining your equipment.

Each page is designed with two columns. This large column on the inside of the page contains instructions and illustrations. Use these instructions to operate and maintain the equipment.

The narrower column on the outside contains additional information such as warnings, special notes, and definitions. Refer to it for safety notes and other information.

Throughout this manual, refer to this column for warnings, cautions, and notices with supplementary information.

## SYMBOLS AND WARNINGS

The following symbols are used throughout this manual to indicate special notes and warnings. They appear in the outside column of the page, next to the section they refer to. Make sure you understand what each symbol means, and follow all instructions for cautions and warnings.

**WARNING**

A WARNING alert with the safety alert symbol indicates a potentially hazardous situation that **could** result in **serious injury or death**.

**CAUTION**

A CAUTION alert with the safety alert symbol indicates a potentially hazardous situation that **could** result in **minor or moderate injury**.

**CAUTION**

A CAUTION alert with the damage alert symbol indicates a situation that **will** result in **damage to the equipment**.

**IMPORTANT**

An IMPORTANT alert with the damage alert symbol indicates a situation that **may** result in **damage to the equipment**.

This is the **safety alert symbol**. It is used to alert you to **potential personal injury hazards**. Obey all safety messages that follow this symbol to avoid possible injury or death.

This is the **equipment damage alert symbol**. It is used to alert you to **potential equipment damage situations**. Obey all messages that follow this symbol to avoid damaging the equipment or workpiece on which it is operating.

NOTE

This symbol indicates a user note. **Notes** provide additional information to supplement the instructions, or tips for easier operation.

**NOTE**

A NOTE provides supplementary information or operating tips.

## MANUAL UPDATES AND REVISION TRACKING

Occasionally, we will update manuals with improved operation or maintenance procedures, or with corrections if necessary. When a manual is revised, we will update the revision history on the title page.

You may have factory service or upgrades performed on the equipment. If this service changes any technical data or operation and maintenance procedures, we will include a revised manual when we return the equipment to you.

Current versions of E.H. Wachs Company manuals are also available in PDF format. You can request an electronic copy of this manual by emailing customer service at sales@wachsco.com.

## EQUIPMENT DESCRIPTION

The Subsea PowerDrill is designed to drill holes up to 5” diameter. Drilling depth is limited by the feed travel of the drill (11.4”/286 mm) and length of tooling. (An extended version of the drill provides a longer tool mounting shaft and stabilizing bearing mount.)

Once set up on the pipe, the drill is operated remotely using E.H. Wachs’ topside control panel. The drill spindle and feed drives are independently controlled. The hydraulic autofeed can be replaced with a feed handle if an application requires manual feed.

The drill is supplied with a pipe-mounting fixture for installation on the O.D. of a 24”-72” diameter pipe. The fixture has mounting shoes with adjustable positions for the pipe diameter, and a ratcheting cable hoist for securing the drill in place.

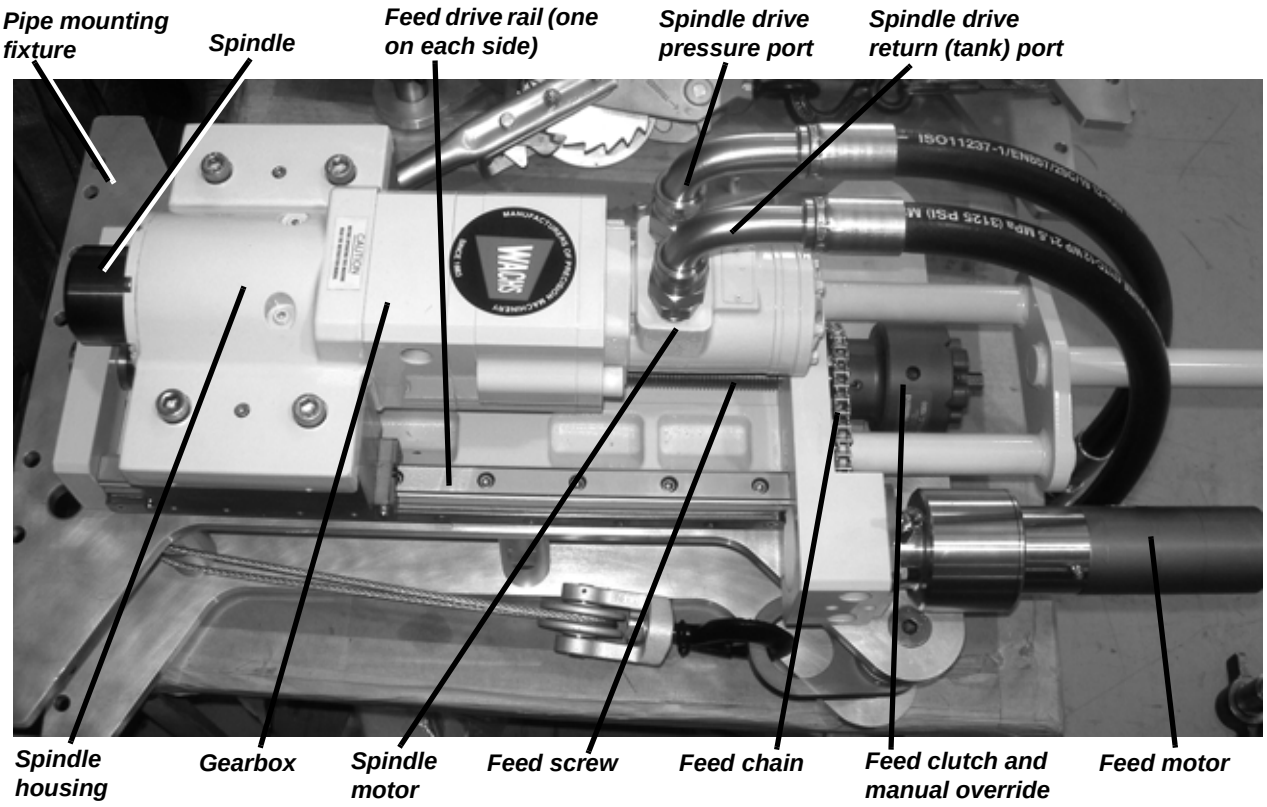



*Figure 1-1. The photo shows the major components of the Subsea PowerDrill with the pipe mounting fixture.*

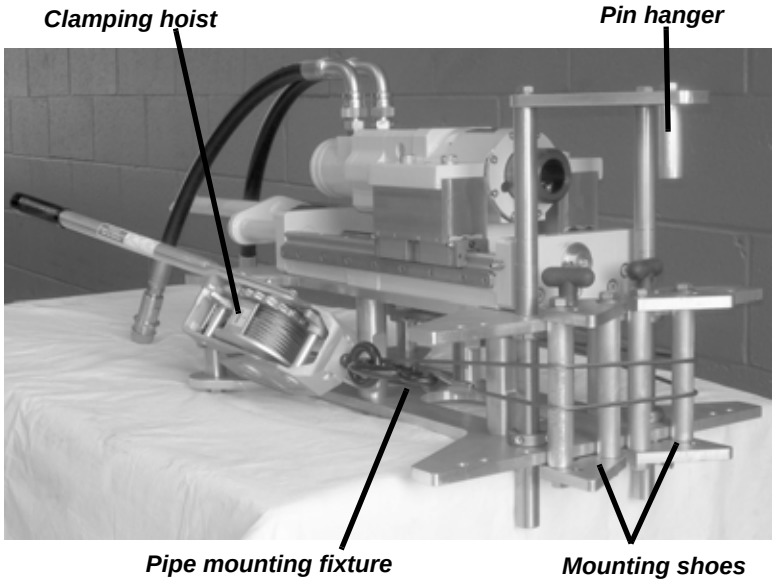



*Figure 1-2. The Subsea PowerDrill is shown in its configuration with the pipe mounting fixture.*

The clamping hoist secures the fixture and drill to the workpiece. When the drill is not in use, wrap and tighten the cable around the front of the mounting fixture in its "parked" position, as shown in Figure 1-2.

The pipe mounting fixture is attached to the drill with four screws, which can be removed to separate the drill and fixture. The fixture includes a pin hanger, shown in Figure 1-2, that makes rough positioning on a pipe end easy. The pin hanger can be removed if you are not using the drill near the pipe end.

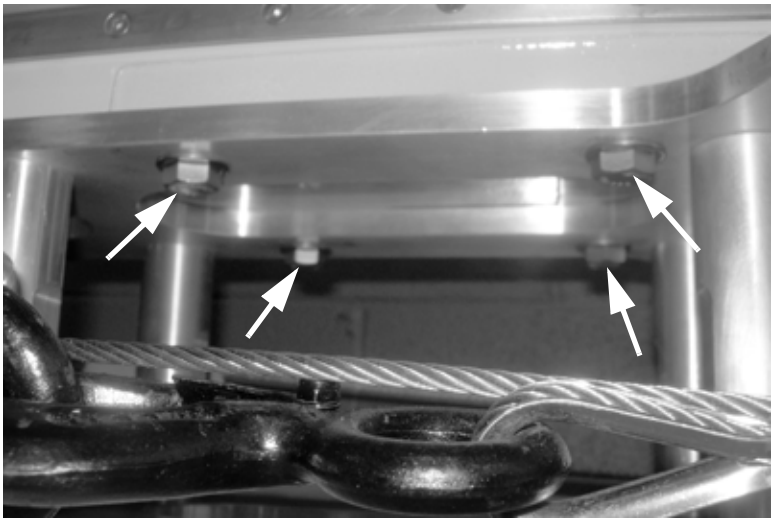


*Figure 1-3. Four screws on the underside of the mounting fixture attach the drill to the fixture.*

The drill has two hydraulic drive circuits: a spindle (cutting) drive and an autofeed drive. Hydraulic power is supplied through the Wachs Topside Control Unit (TCU), shown in Figure 1-4. Instructions for connecting and operating the TCU are in Chapter 3.

**NOTE**

The instruction manual for the cable hoist is included at the back of this manual.

**NOTE**

The drill can be used without the fixture and mounted using customer hardware at the workpiece location. E.H. Wachs can also build customized mounting hardware to customer-supplied specifications.

*Figure 1-4. The Wachs topside control unit (TCU) has controls for up to four independent hydraulic circuits. The Subsea PowerDrill uses two of these circuits: the Cutter drive for the spindle and the Feed Circuit #1 drive for the hydraulic autofeed.*

## Extended Shaft Configuration

The subsea PowerDrill is available with an extended tool mounting shaft for longer reach. A bearing support mount stabilizes the shaft when the drill is extended. The extended shaft configuration is shown in Figure 1-5.

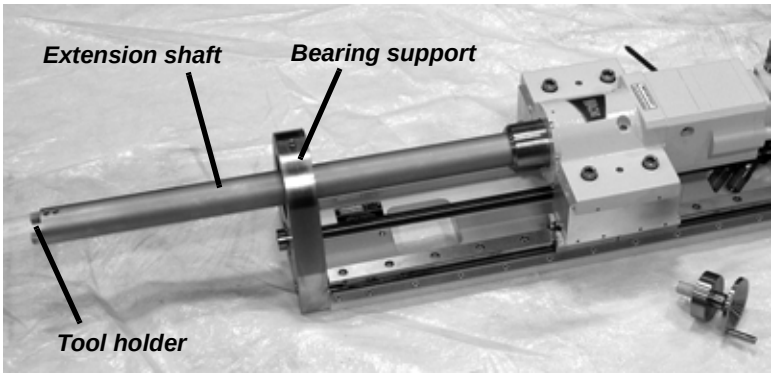



*Figure 1-5. The extended version allows the drill to reach farther than the standard configuration.*

## Specifications

### Drill Specifications

- Feed travel: 11.4" (286 mm)
- Feed speed: 0.56”/min maximum autofeed
- Mounting height adjustment on mounting fixture: 9" (229 mm)
- Max. pipe diameter for mounting fixture: 72" (610 mm) *Other mounting configurations available.*

### Spindle

| | |
|---|---|
| Drill speed | 0-250 RPM variable |
| Spindle bore | 1.5” (38 mm) straight bore |
| Adapter sockets accepted | Up to #4 MT |
| Maximum hole size | 5” (127 mm) hole saw |

### Dimensions

Standard Subsea PowerDrill

| | |
|---|---|
| Height | 11.5” (292 mm) |
| Width | 11.5” (292 mm) |
| Length | 41” (1042 mm) |

| | |
|---|---|
| Weight | 147 lb (67 kg)<br>160 lb (73 kg) extended configuration |

Subsea PowerDrill With Pipe Mounting Accessory

| | |
|---|---|
| Height | 19.13” (486 mm) |
| Width | 19.63” (499 mm) |
| Length | 43” (1093 mm) |
| Weight | 213 lb (97 kg)<br>226 lb (103 kg) extended config. |

## Layout and Feature Drawings

The following drawings call out the features and dimensions of the Subsea PowerDrill.

REPLACE PAGE WITH LAYOUT DRAWING PAGE 1

REPLACE PAGE WITH LAYOUT DRAWING PAGE 2

# Chapter 2
# Safety

The E.H. Wachs Company takes great pride in designing and manufacturing safe, high-quality products. We make user safety a top priority in the design of all our products.

Read this chapter carefully before operating the Subsea PowerDrill. It contains important safety instructions and recommendations.

**In This Chapter**

OPERATOR SAFETY

SAFETY LABELS

MACHINE SAFETY

## OPERATOR SAFETY

Follow these guidelines for safe operation of the equipment.

- **READ THE OPERATING MANUAL.** Make sure you understand all setup and operating instructions before you begin.
- **INSPECT MACHINE AND ACCESSORIES.** Before starting the machine, look for loose bolts or nuts, leaking lubricant, rusted components, and any other physical conditions that may affect operation. Properly maintaining the machine can greatly decrease the chances for injury.
- **ALWAYS READ PLACARDS AND LABELS.** Make sure all placards, labels, and stickers are clearly legible and in good condition. You can purchase replacement labels from E.H. Wachs Company.
- **KEEP CLEAR OF MOVING PARTS.** Keep hands, arms, and fingers clear of all rotating or moving parts.

Look for this symbol throughout the manual. It indicates a personal injury hazard.

Always turn machine off before doing any adjustments or service.

- **SECURE LOOSE CLOTHING AND JEWELRY.** Secure or remove loose-fitting clothing and jewelry, and securely bind long hair, to prevent them from getting caught in moving parts of the machine.
- **KEEP WORK AREA CLEAR.** Keep all clutter and nonessential materials out of the work area. Only people directly involved with the work being performed should have access to the area.

## Safety Symbols

This icon is displayed with any safety alert that indicates a personal injury hazard.

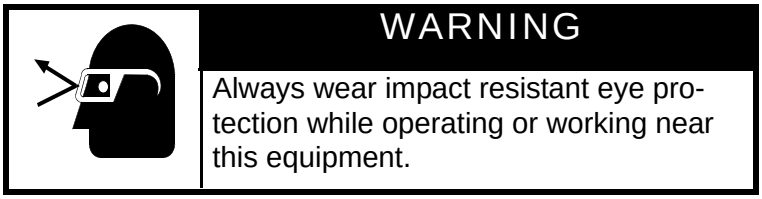
### ⚠ WARNING

This safety alert indicates a potentially hazardous situation that, if not avoided, **could** result in **death or serious injury**.

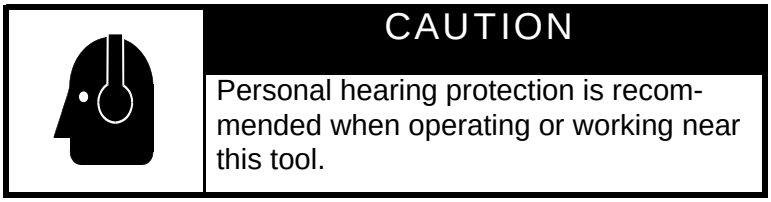
### ⚠ CAUTION

This safety alert, with the personal injury hazard symbol, indicates a potentially hazardous situation that, if not avoided, **could** result in **minor or moderate injury**.

### Protective Equipment Requirements




For additional information on eye and face protection, refer to Federal OSHA regulations, 29 Code of Federal Regulations, Section 1910.133., Eye and Face Protection and American National Standards Institute, ANSI Z87.1, Occupational and Educational Eye and Face Protection. Z87.1 is available from the American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018.




Hearing protectors are required in high noise areas, 85 dBA or greater. The operation of other tools and equipment in the area, reflective surfaces, process noises, and resonant structures can increase the noise level in the area. For additional information on hearing protection, refer to Federal OSHA regulations, 29 Code of Federal Regulations, Section 1910.95, Occupational Noise Exposure and ANSI S12.6 Hearing Protectors.

## SAFETY LABELS

There is no safety labeling on the Subsea PowerDrill.

## MACHINE SAFETY

To avoid damaging the equipment, follow these usage guidelines.

- Lubricate the machinery according to the recommendations in Chapter 4.
- Before starting the machine, make sure the tooling is inserted and fastened securely.
- Make sure that the mounting fixture is securely fastened to the drill.
- Make sure that the cable hoist is securely tightened before drilling, and that the cable is straight on the pipe.
- Make sure that all hydraulic connections are secure.

# Chapter 3

# Operating Instructions

**In This Chapter**

SETTING UP THE SUBSEA POWERDRILL

INSTALLING THE DRILL ON THE WORKPIECE

OPERATING THE DRILL

REMOVING THE DRILL

## SETTING UP THE SUBSEA POWERDRILL

### Installing the Tooling

The Subsea PowerDrill has a 1.5” spindle that can hold a variety of standard industrial tool holders.

1. Loosen the spindle set screw using a 1/2” wrench or socket.

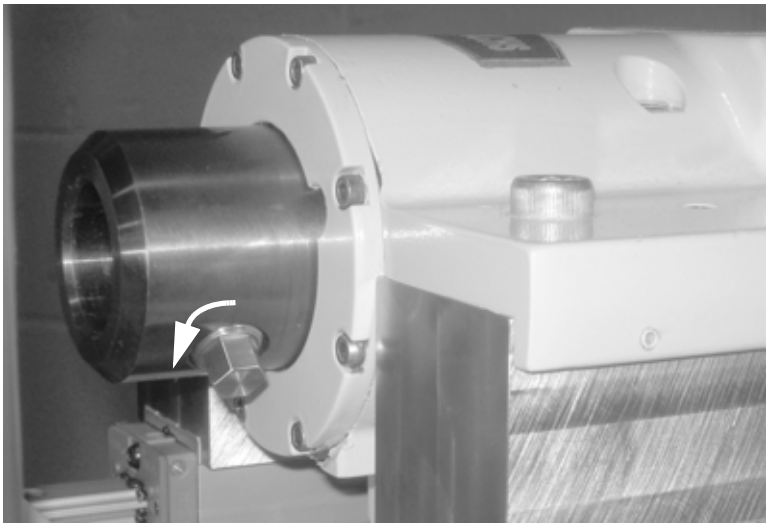


*Figure 3-1. Turn the spindle set screw counter-clockwise to loosen it.*

2. Insert the tooling adapter into the spindle. Make sure the flat on the surface of the adapter is facing the set screw.

3. Tighten the set screw to hold the adapter in place.

4. Insert the tooling into the adapter. You can also install the tooling in the adapter before mounting the adapter in the spindle.

5. Make sure the drill feed is retracted far enough so that the end of the tool does not extend past the pipe mounting fixture. If necessary, retract the feed manually, or use the autofeed drive once you have connected the hydraulic hoses to the drill.

## Adjusting the Pipe Mounting Fixture

### Setting the Mounting Feet for the Pipe O.D.

There are four mounting positions on the fixture for each mounting foot. Move the feet farther apart for larger pipe sizes. See Table 1 for mounting feet positions.

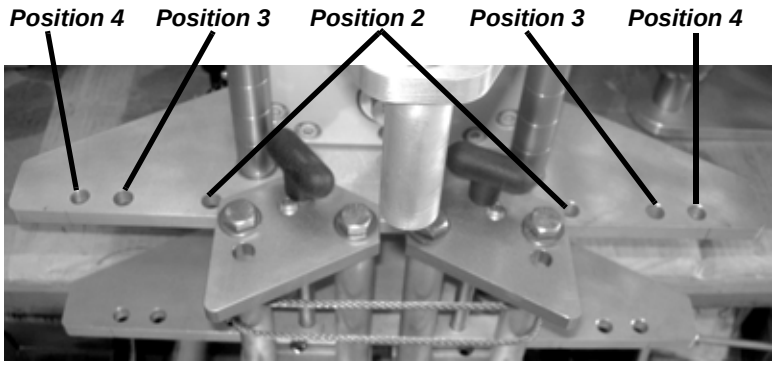
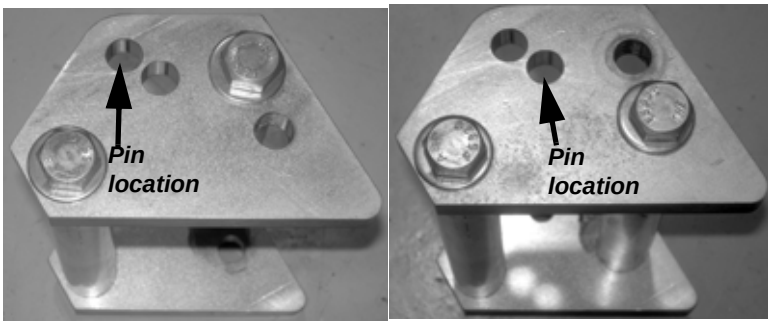



*Figure 3-2. The mounting feet are shown in Position 1 on the fixture, with the other positions labeled.*

For pipe diameters above 48”, there is an alternate assembly for the mounting foot. See Figure 3-3 to change the foot assembly.

**Table 1: Mounting Feet Positions**

| Pipe Diameter (O.D.) | Mounting Feet Position |
|---|---|
| up to 14” | Position 1 (innermost) |
| 14”-22” | Position 2 |
| 22”-32” | Position 3 |
| 32”-48” | Position 4 |
| 48”-72” | Position 4 with alternate foot assembly |




***Standard assembly (pipes under 48”)*** ***Alternate assembly (pipes over 48”)***

*Figure 3-3. The left photo shows the mounting foot in the standard assembly. The right photo shows the foot in the alternate assembly for pipe diameters over 48”.*

## Setting the Hanger Attachment

The pin hanger is used to hold the drill on a vertical pipe while you set up and tighten it using the cable hoist. It has two adjustments:

- the pin can be moved radially for different pipe diameters and wall thicknesses.
- the attachment can be moved vertically to set the drilling distance from the end of the pipe. The adjustment range is about 6 inches.

To adjust the pin, remove the screw in the top plate. For thinner or smaller diameter pipes, move the pin in (toward the drill). For thicker and larger diameter pipes, move the pin out (away from the drill).

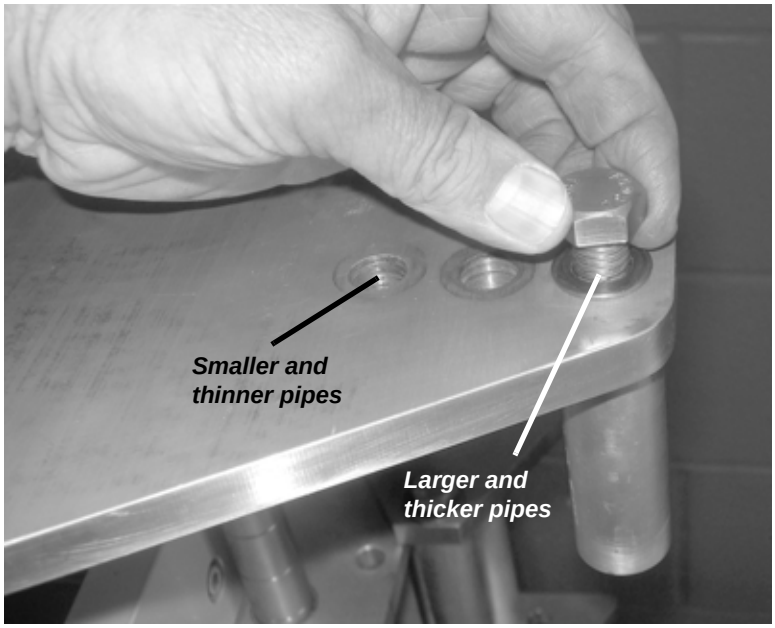



*Figure 3-4. Set the pin in the best location for the size and thickness of the pipe you are mounting the drill on.*

Use the following procedure to set the height of the pin hanger.

1. Position the drill so that the fixture hangs over the end of the workbench, or suspend the drill using a crane or hoist.

2. Loosen the clamp collars on the mounting rods using a 3/16” hex wrench in the set screw. There are two collars on each rod.

**CAUTION**

Hold or secure the pin hanger when loosening the clamp collars. The hanger will drop when the bottom collars are loosened. Personal injury could result.

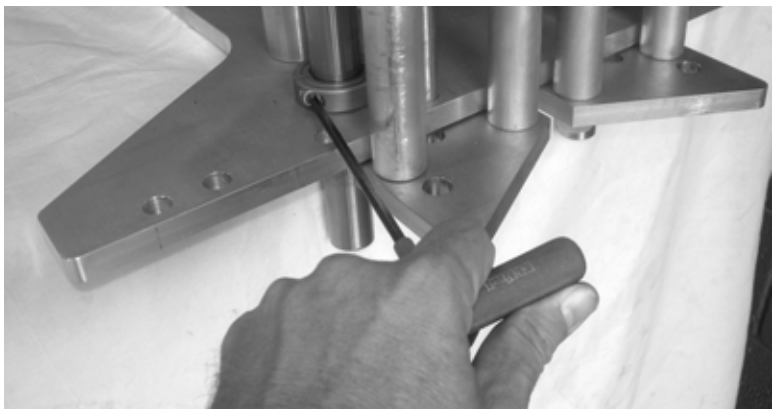


*Figure 3-5. Loosen the set screws in the clamp collars on the mounting rods.*

3. With all four collars loose, move the pin hanger to the desired position. There are indicator marks on the rods at 1” intervals. Putting the rods at the top mark sets the spindle center at the end of the pipe; each mark moves the spindle down 1” from the end of the pipe. See Figure 3-6 and Figure 3-7.

*Figure 3-6. With the top mark in the mounting rod flush with the fixture, as shown, the spindle will be aligned with the end of the pipe.*

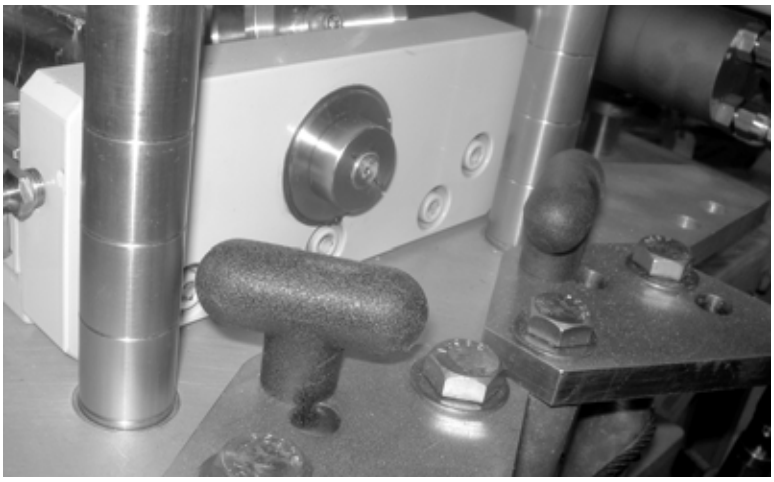


*Figure 3-7. The photo shows the mounting rods moved up 3 inches (three marks). The spindle will be 3 inches from the end of the pipe.*

4. Tighten the set screws in the bottom collars on both rods.

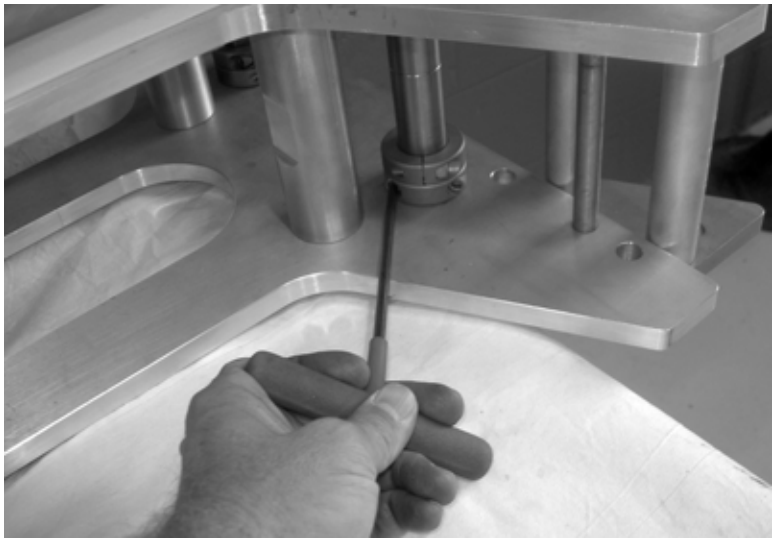


*Figure 3-8. Tighten the bottom collar on both mounting rods.*

5. Move the top collars up against the fixture plate and tighten their set screws.

*Figure 3-9. Move the top collars up and tighten their set screws.*

**Removing and Re-Installing the Hanger Attachment**

Use the hanger attachment when you are drilling within 6” of the end of a vertical pipe. If you are drilling in another location or configuration, remove the hanger.

1. Loosen the top and bottom clamp collars on both mounting rods.
2. Pull the hanger attachment up out of the mounting fixture. Be careful not to drop or lose the clamp collars.
3. Replace and tighten the clamp collars on the mounting rods so they do not get lost.

*Figure 3-10. Replace the collars on the mounting rods and tighten the screws to secure them.*

4. To replace the hanger attachment, stack two collars over each mounting rod hole in the bottom plate of the fixture, and insert the mounting rods through the fixture and the collars.

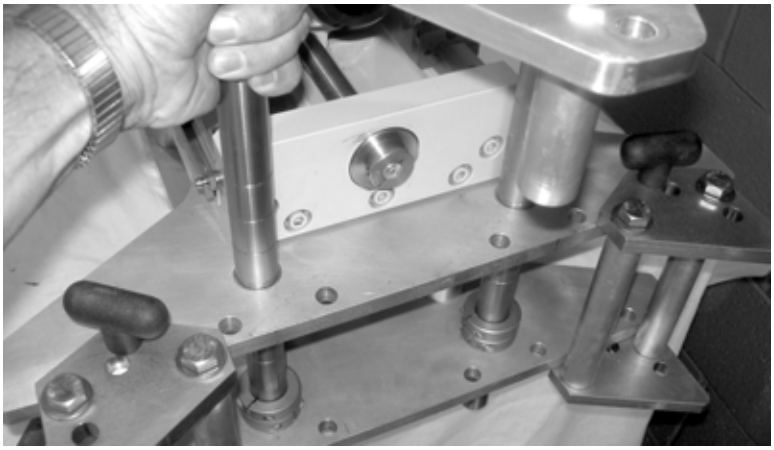


*Figure 3-11. Insert the mounting rods through the clamp collars.*

**CAUTION**

Hold or secure the pin hanger when loosening the clamp collars. The hanger will drop when the bottom collars are loosened. Personal injury could result.

5. Adjust the hanger and tighten the collars as described in the previous section.

## Installing the Manual Feed Handle

To operate the drill feed drive manually, replace the hydraulic feed motor with the feed handle provided.

1. Using a 9/64” hex wrench, remove the 7 screws holding the feedbox input housing to the feedbox output housing.

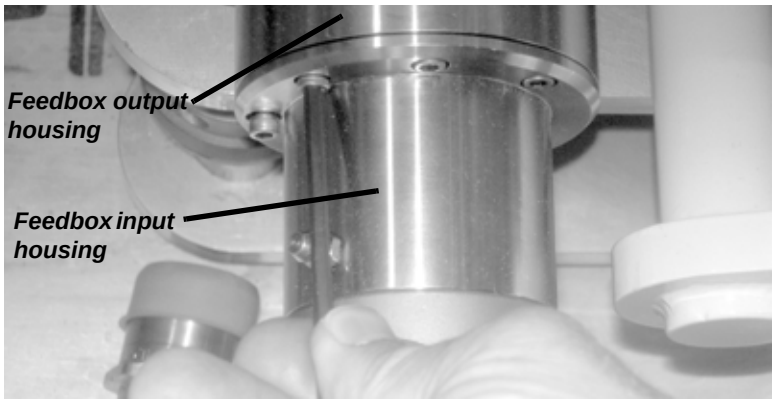



*Figure 3-12. Remove the screws holding the feedbox input housing.*

2. Remove the feedbox input housing and hydraulic motor assembly.

*Figure 3-13. Remove the feedbox input housing.*

3. Clean the grease out of the feedbox input housing so that you can access the screws holding it to the hydraulic motor.

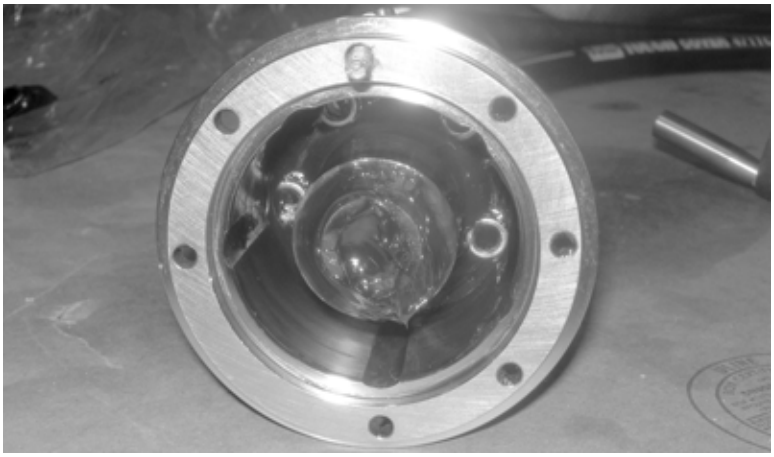


*Figure 3-14. Clean out the grease in the feedbox input housing to access the screws.*

4. Using a 3/16” hex wrench, remove the 5 screws holding the feedbox input housing to the motor.

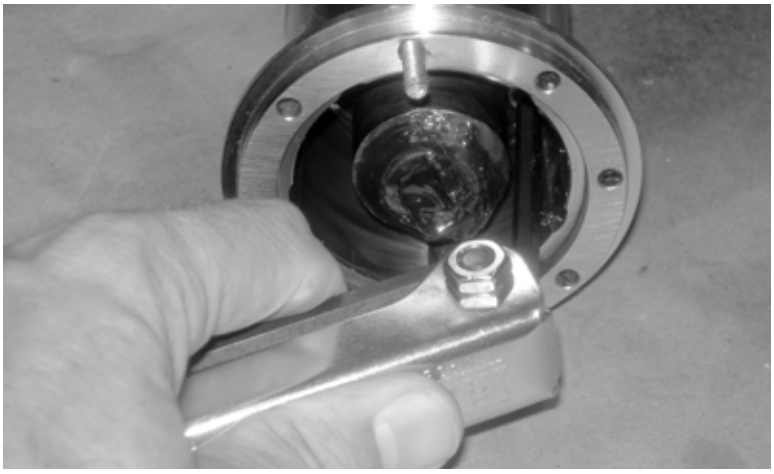


*Figure 3-15. Remove the screws holding the feedbox input housing to the hydraulic motor.*

5. Remove the feedbox input housing from the motor.

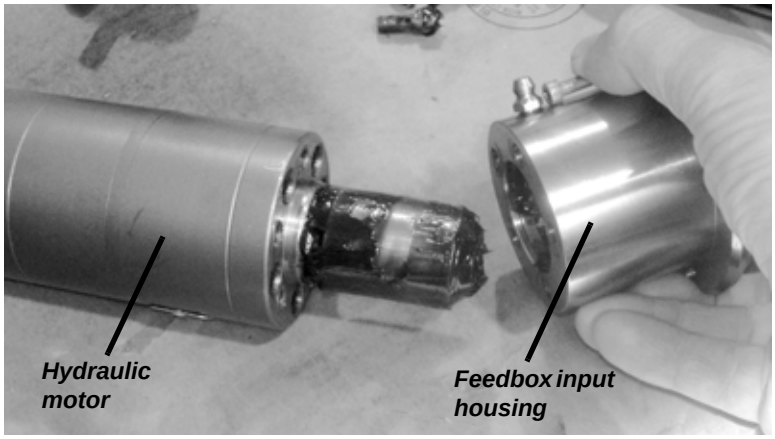



*Figure 3-16. Remove the feedbox input housing.*

6. Using a 3/16” hex wrench, remove the screw holding the motor input coupler to the motor shaft.

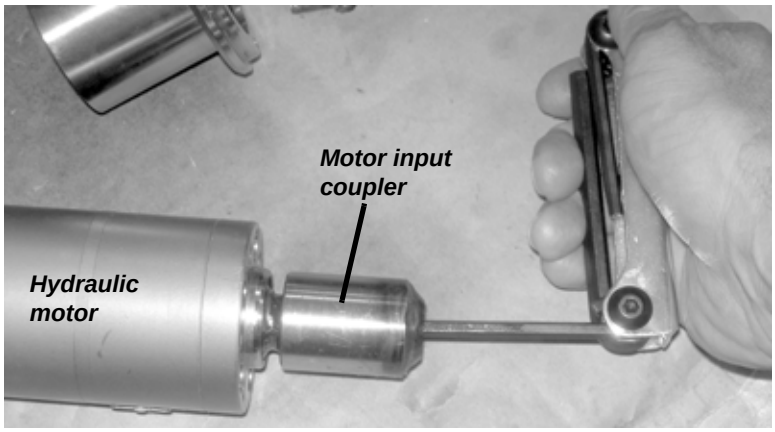



*Figure 3-17. Remove the screw in the end of the motor input coupler.*

7. Remove the motor input coupler from the motor shaft. Be careful not to lose the key in the motor shaft slot.

**NOTE**

You can tape the key to the motor shaft to keep from losing it.

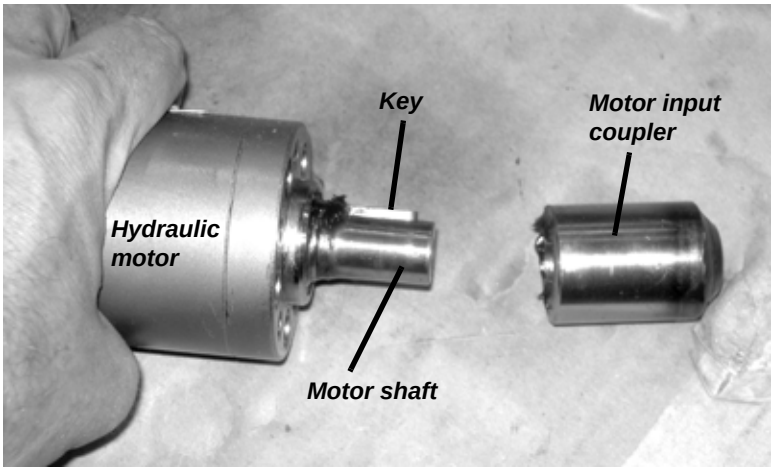



*Figure 3-18. Remove the motor input coupler from the motor shaft.*

8. Insert the motor input coupler over the shaft of the manual feed handle. Make sure the key is in place and fits into the slots on the shaft and the coupler.

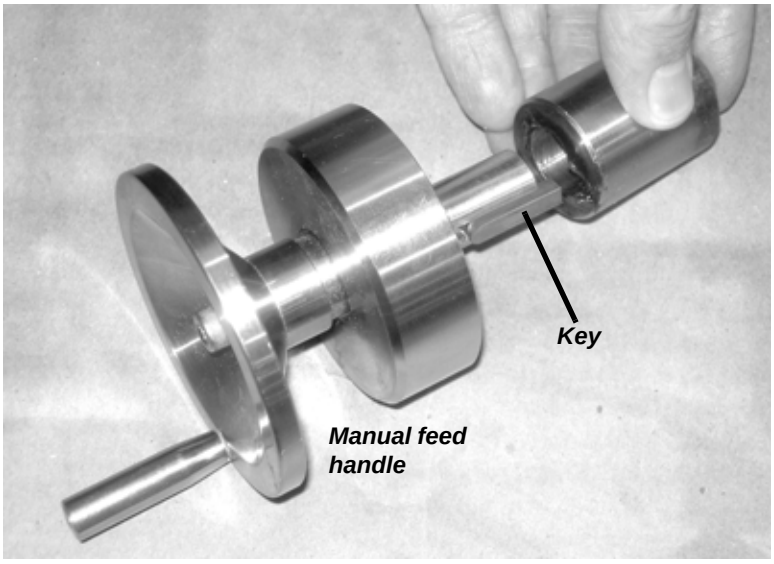



*Figure 3-19. Install the motor input coupler onto the manual feed handle.*

9. Using a 3/16” hex wrench, insert and tighten the screw in the end of the motor input coupler.

**NOTE**

The key in the manual feed handle is NOT the same as the key in the hydraulic motor shaft. Keep each key with the component it belongs with.

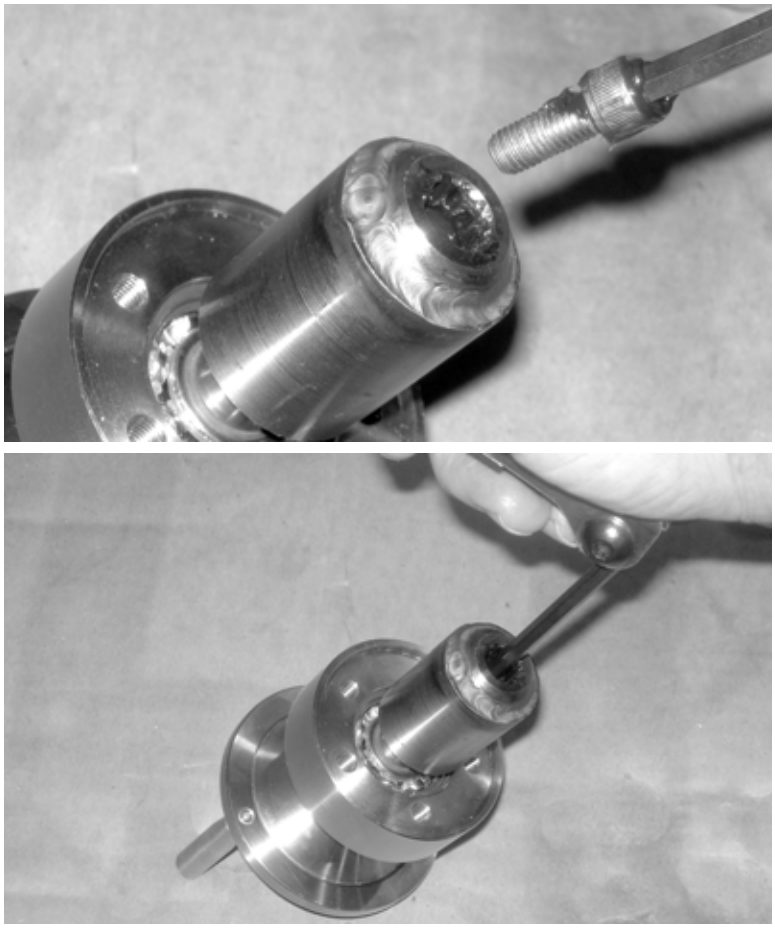


*Figure 3-20. Attach the motor input coupler to the handle.*

10. Install the feedbox input housing over the motor input coupler to the manual feed adapter.

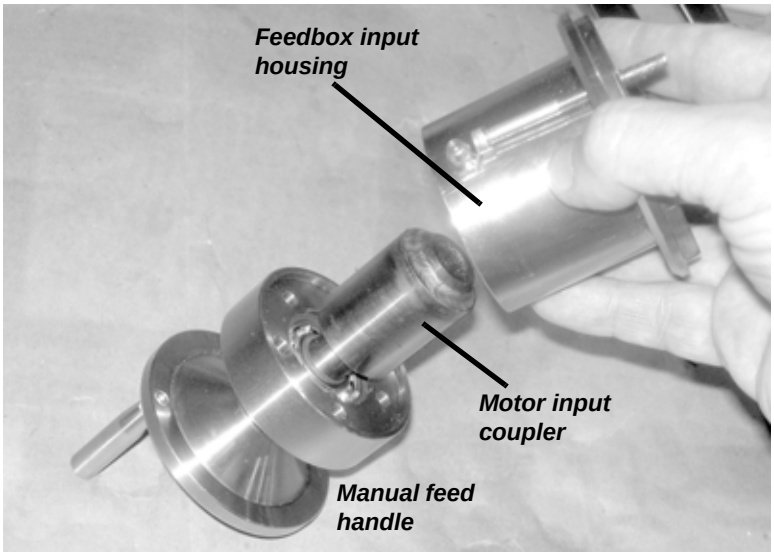



*Figure 3-21. Put the feedbox input housing onto the manual feed handle.*

11. Rotate the housing to line up the screw holes with the holes in the manual feed handle adapter. Make sure all holes line up; there is only one correct orientation.

12. Insert the 5 screws to attach the housing to the adapter. Tighten all screws securely.

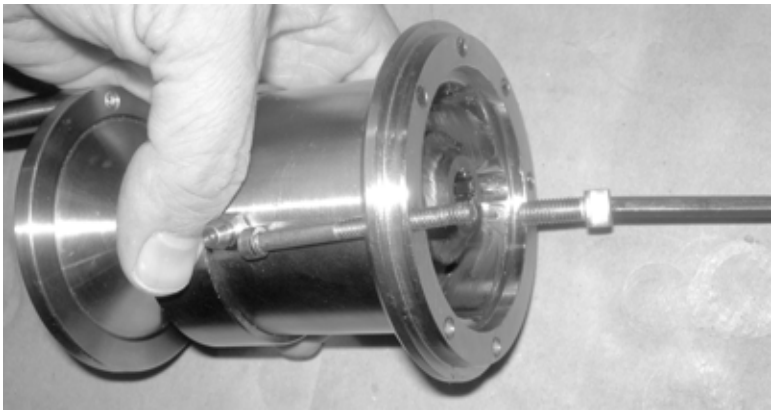


*Figure 3-22. Insert the 5 screws to secure the housing to the feed handle adapter.*

13. Replace the feedbox input housing and feed handle assembly onto the feedbox output housing. Rotate the housing to line up the screw holes. There is one correct orientation (see position of grease fitting in Figure 3-24).

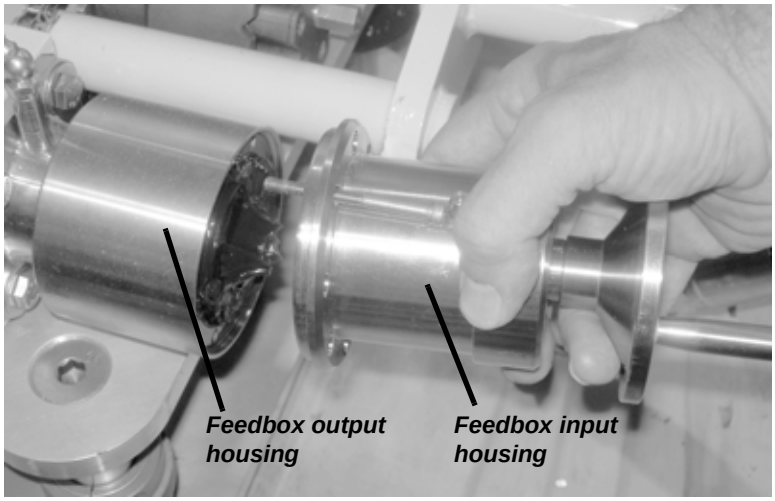



*Figure 3-23. Install the feed input housing with feed handle on the feedbox output housing and align the screw holes.*

14. Insert and tighten the 7 screws holding the housing to the feedbox.

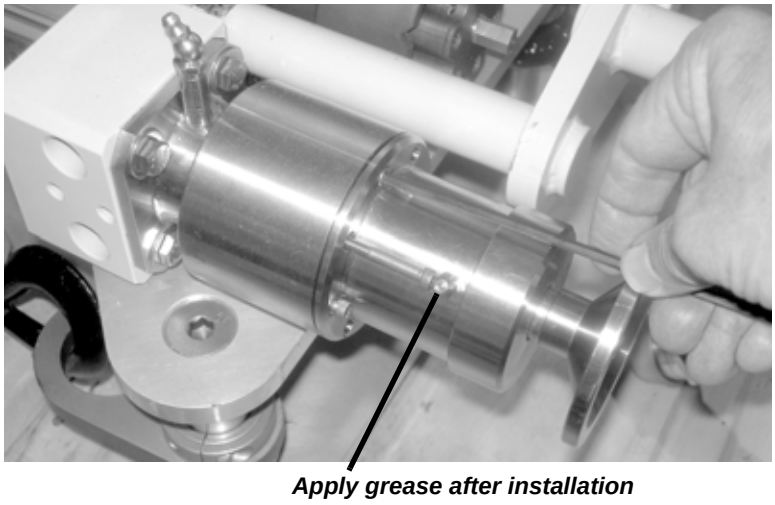



*Figure 3-24. Insert the screws that hold the housing to the feedbox.*

15. Apply grease to the fitting on the feedbox input housing to repack the housing.

## Connecting the Hydraulic Lines

Connect the hydraulic lines to the drill before locating it underwater for drilling. If you are using the drill out of

water, you can install it on the workpiece before making the hydraulic connections.

1. Connect the hoses from the hydraulic power unit (HPU) to the HPU ports on the back of the topside control unit, as shown in Figure 3-25.

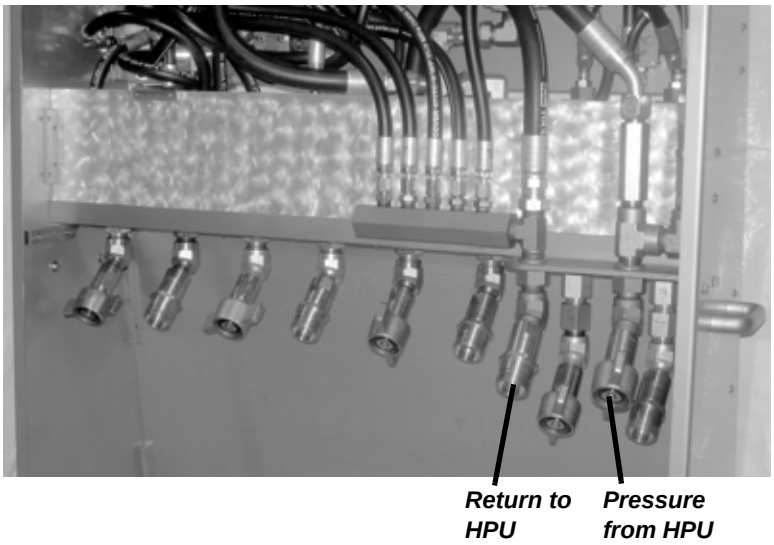



*Figure 3-25. Connect the hoses from the hydraulic power unit to the back of the TCU as shown.*

2. Connect the spindle drive hoses to the cutter circuit ports on the back of the TCU.

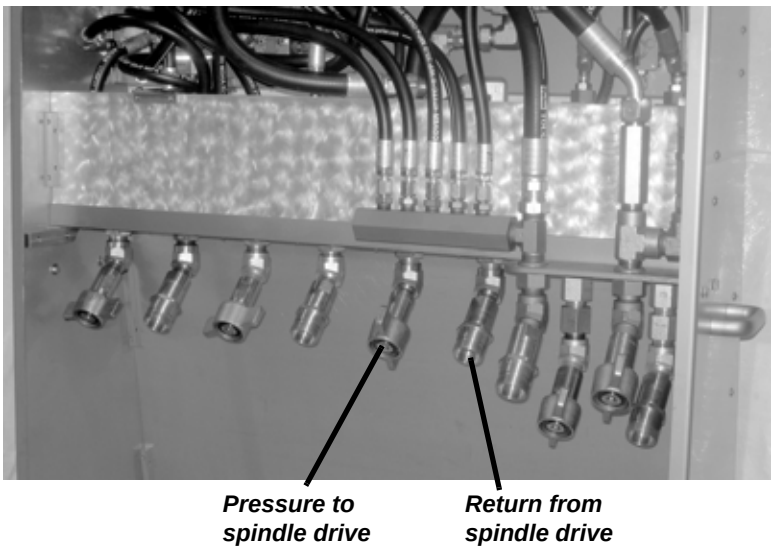



*Figure 3-26. Connect the spindle hoses going to the drill to the spindle (cutter) ports on the back of the TCU as shown.*

**NOTE**

If you are connecting the drill with a hose reel, connect the spindle drive hoses to the drive circuit connections on the hose reel.

**NOTE**

If you are connecting the drill with a hose reel, connect the feed drive hoses to the feed circuit connections on the hose reel.

3. Connect the feed drive hoses to the feed circuit #1 ports on the back of the TCU.

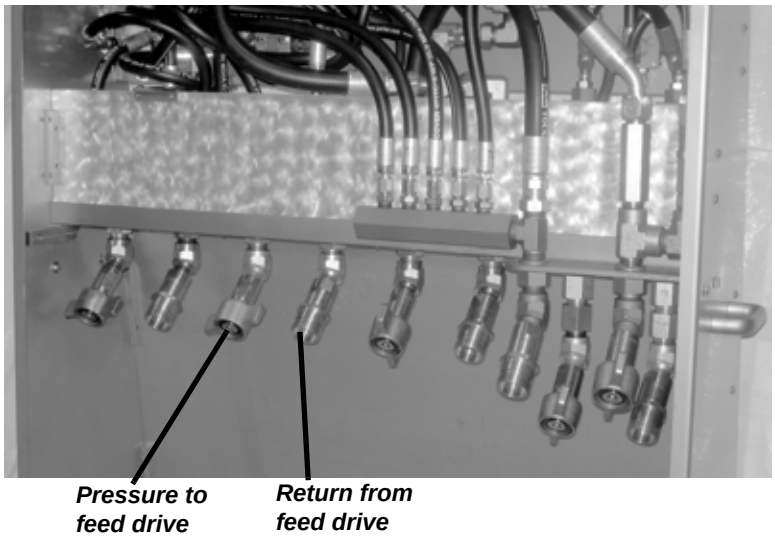



*Figure 3-27. Connect the feed hoses going to the drill to the feed circuit #1 ports on the back of the TCU as shown.*

4. Connect the spindle circuit hoses from the TCU or hose reel to the spindle drive ports on the drill.

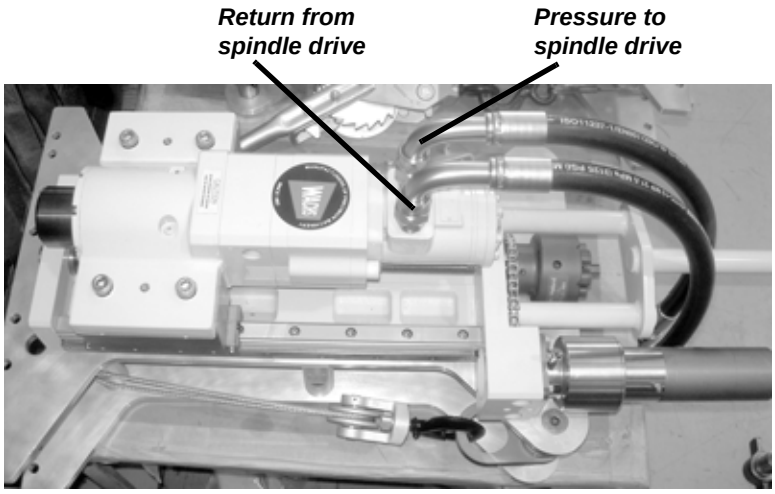



*Figure 3-28. Connect the spindle circuit hoses to the drill as shown. (Drill shown with spindle motor hose whips.)*

5. Connect the feed circuit hoses from the TCU or hose reel to the feed drive ports on the drill.

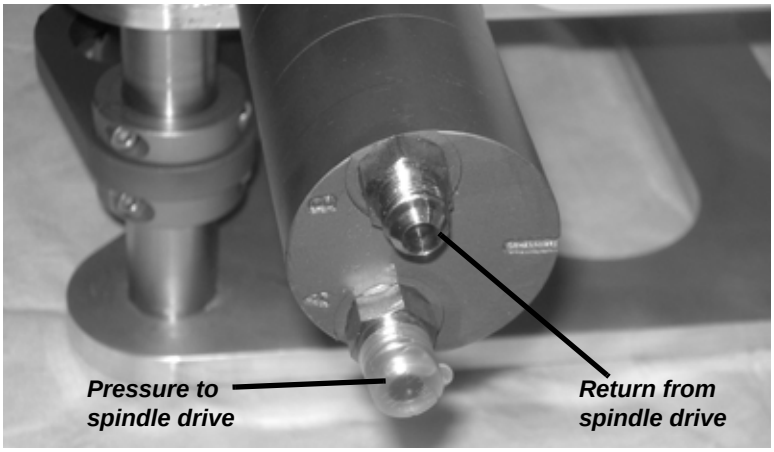



*Figure 3-29. Connect the feed circuit hoses to the feed motor as shown. (The feed motor may have hose whips installed.)*

## INSTALLING THE DRILL ON THE WORKPIECE

The drill can be installed on a pipe at any orientation—horizontal, vertical, or at an angle. The mounting fixture will square the drill to the pipe surface.

The cable on the mounting fixture should be kept in its "parked" condition when the drill is not in use. The cable hooks are attached to the eyes used for mounting, and the cable is pulled tight across the front of the mounting fixture, (Figure 3-30). Detach the cable pulley hook and wind up the cable slack before positioning the drill for installation.

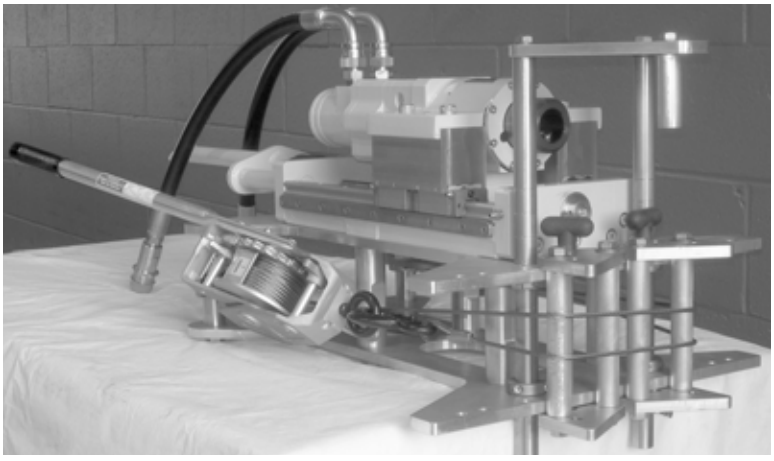


*Figure 3-30. The drill is shown with the mounting cable in the "parked" position around the fixture.*

If you are installing the drill without using the mounting fixture, you will need to attach the drill to the workpiece or to a rigid support at the work location.

## Rigging and Lifting the Drill

A lift eye on the drill allows you to lift it vertically. You can use this hook with the standard configuration drill or the drill with the pipe mounting fixture.

To rig the drill for horizontal mounting on a vertical pipe, use a lift strap around the gearbox housing.

**CAUTION**

Do NOT lift the drill by the hydraulic motors or other components. Damage to the machine will result.

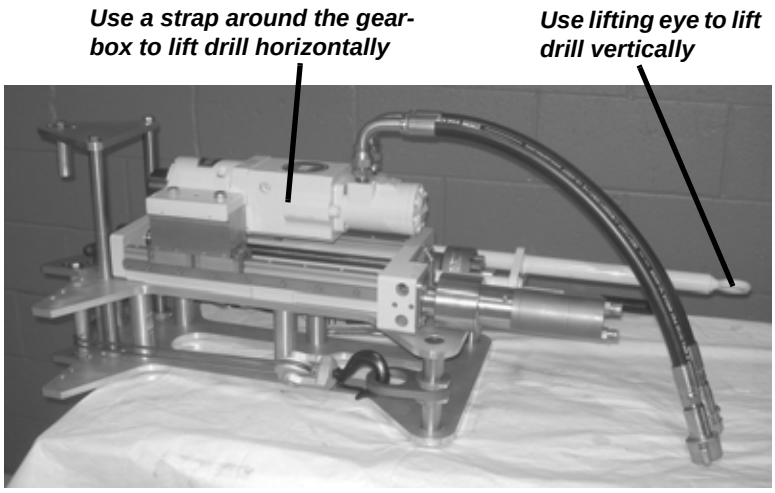



*Figure 3-31. Lift the drill at the points shown.*

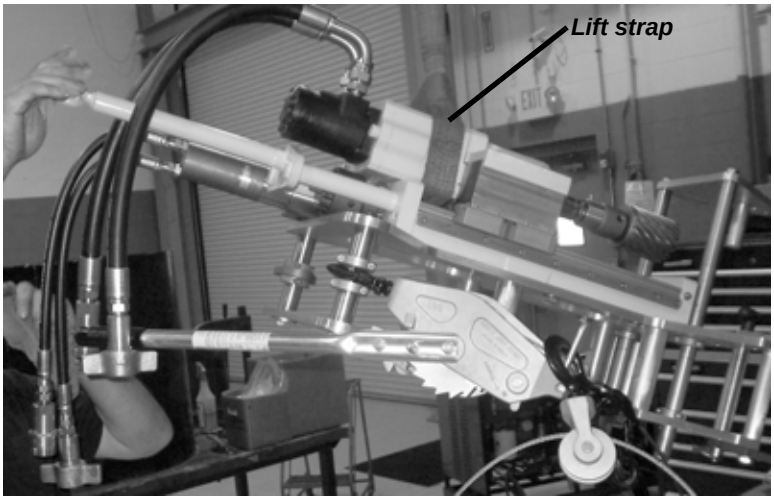



*Figure 3-32. The photo shows the drill being lifted into place for horizontal mounting, using a strap around the gearbox.*

## Using the Pipe Mounting Fixture

If you are drilling within 6” of the end of a vertical pipe, use the pin hanger with the pipe mounting fixture to position the pipe. Set the distance from the pipe end using the instructions in “Adjusting the Pipe Mounting Fixture” earlier in this chapter.

1. Attach the lift strap around the gearbox of the drill.
2. Using a crane, lift the drill over the drilling position at the end of the pipe.
3. If necessary, remove the cable hoist from its parked position with the cable around the mounting fixture. Operate the hoist handle to wind the cable onto the hoist.
4. Align the drill so that the pin hooks over the end of the pipe wall as you lower the drill.
5. If necessary, adjust the drill to align the spindle with the drilling location.
6. Lower the drill until it is being supported by the pin hanger.
7. Secure the drill using the procedure in the following section.

**NOTE**

If you are drilling horizontal pipe or drilling more than 6” from the end of a vertical pipe, remove the pin hanger from the mounting fixture.

**NOTE**

The instruction manual for the cable hoist is included at the back of this manual.

## Using the Cable Hoist to Attach the Drill

1. If necessary, take the tension out of the cable by backing up the hoist handle and holding the trigger.
2. Pull the handle of the hoist far enough to release the trigger, then pull the handle back and disengage the ratchet switch.

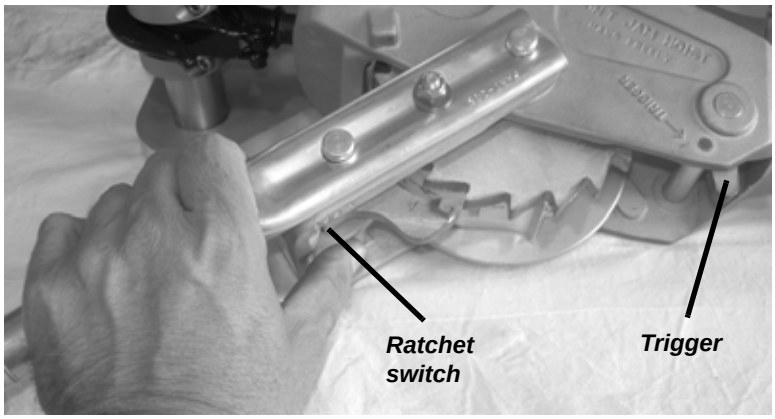



*Figure 3-33. Disengage the ratchet switch after releasing tension from the cable.*

3. While holding the trigger, pull enough cable out of the hoist to reach around the pipe to the opposite side of the drill.

*Figure 3-34. Hold the trigger to release the hoist and pull enough cable off the reel to reach around the pipe.*

4. Attach the middle hook on the cable (the one mounted on the pulley) to the mounting eye on the opposite side of the drill.

*Figure 3-35. Attach the pulley hook to the eye on the side of the mounting fixture opposite the hoist.*

5. Holding the trigger to release the cable, pull the end hook back around the pipe to the hoist side of the drill.

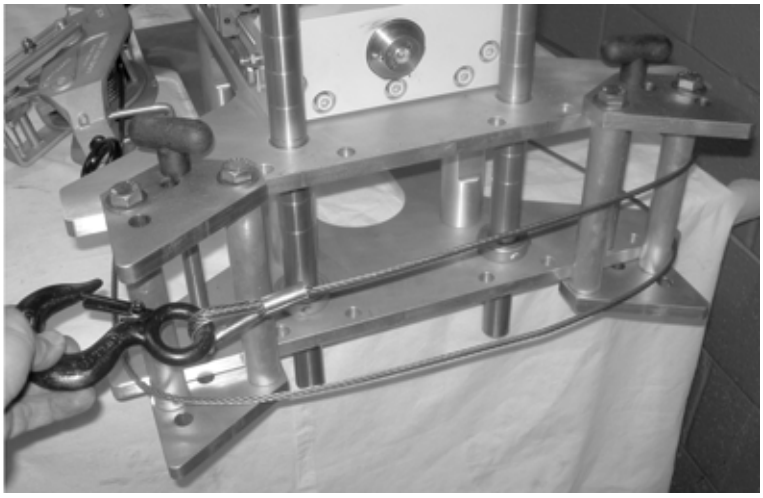


*Figure 3-36. Pull the cable back around the mounting fixture (shown without pipe).*

6. Attach the end hook to the eye on the hoist. Release the trigger.

*Figure 3-37. Attach the end hook to the eye on the hoist.*

7. Engage the ratchet switch.

*Figure 3-38. Press the ratchet switch to engage it.*

8. Operate the hoist handle to take slack out of the cable.
9. If necessary, adjust the cable on the surface of the pipe so that it is straight on the pipe. Make sure the two loops do not overlap.

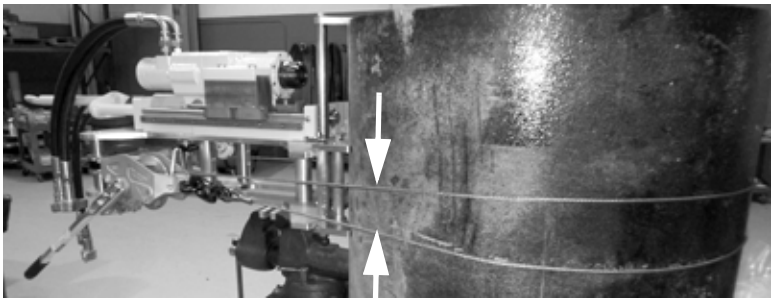


*Figure 3-39. As you tighten the cable, adjust the height and spacing of the cable loops on the pipe surface.*

10. Operate the hoist handle to pull the drill tight against the pipe. Check the position of the cable loops on the pipe as you tighten, and adjust if necessary.

## OPERATING THE DRILL

Before starting the drill, make sure the feed drive is retracted far enough so that the tooling is not in contact with the workpiece.

The topside control unit (TCU) has controls for four hydraulic circuits. The Subsea PowerDrill uses two circuits: the Cutter circuit and the Feed Circuit #1.

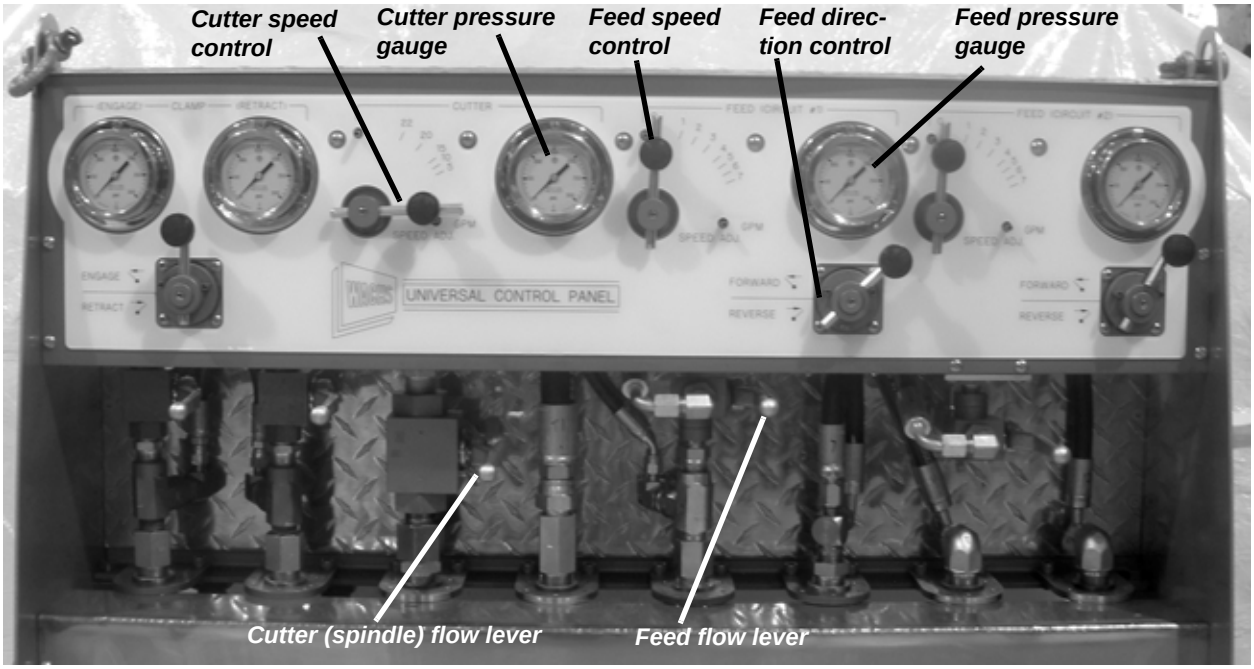



*Figure 3-40. The Subsea PowerDrill uses the Cutter circuit and the Feed Circuit #1 controls on the TCU.*

1. At the topside control unit (TCU), make sure all drive circuit flow levers are closed (in the UP position).
2. Turn on the hydraulic power unit (HPU).
3. Set the Cutter speed control on the TCU to 0, and set the Feed Circuit #2 speed control to 0.

*Figure 3-41. Set the speed controls for the Cutter and the Feed Circuit #1 to 0 before starting the cutter (spindle) drive.*

4. Set the Feed Circuit #1 direction lever on the TCU to FORWARD.

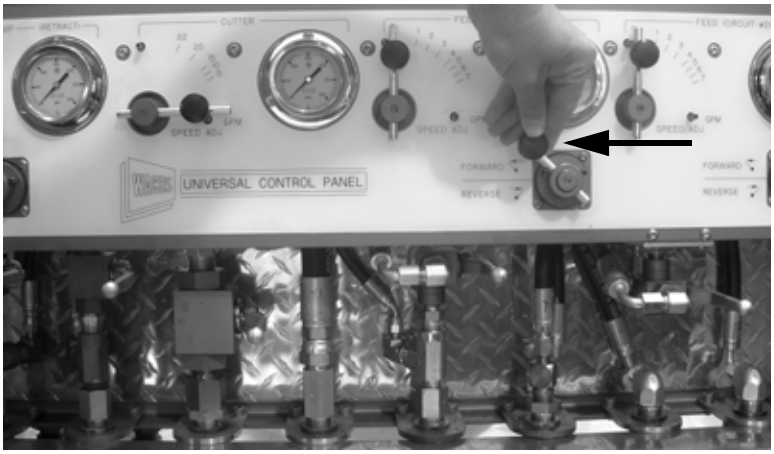



*Figure 3-42. Set the Feed Circuit #1 direction to FORWARD.*

5. Push the Cutter flow lever down to open it.

*Figure 3-43. Engage the Cutter drive circuit by pushing the flow lever down.*

6. Set the Cutter speed control on the TCU to the desired level for the tool you are using. Visually verify that the spindle is turning in the correct direction.

**NOTE**

The optimum cutter flow is generally between 10-15 gpm. Lower flow may stall the spindle; higher flow may not leave enough to drive the feed circuit.

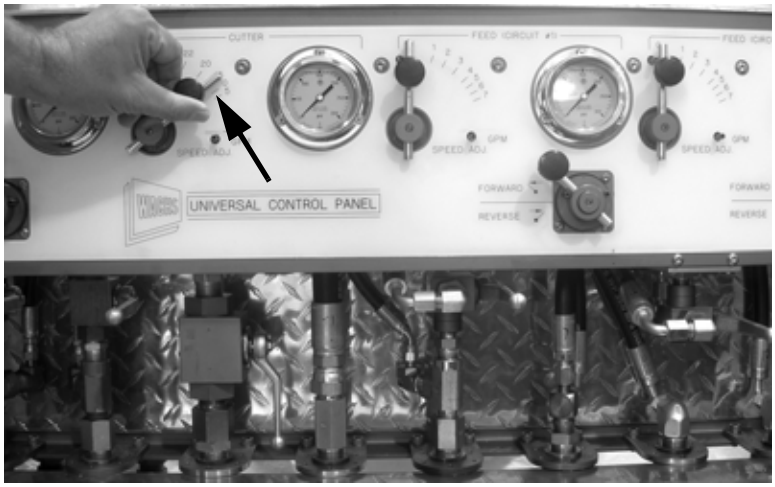



*Figure 3-44. Set the Cutter speed to about 10-15 gpm.*

7. Make sure the Feed Circuit #1 speed control on the TCU is set to 0, as shown above in Figure 3-41.

8. Push the Feed Circuit #1 flow lever down to open it.

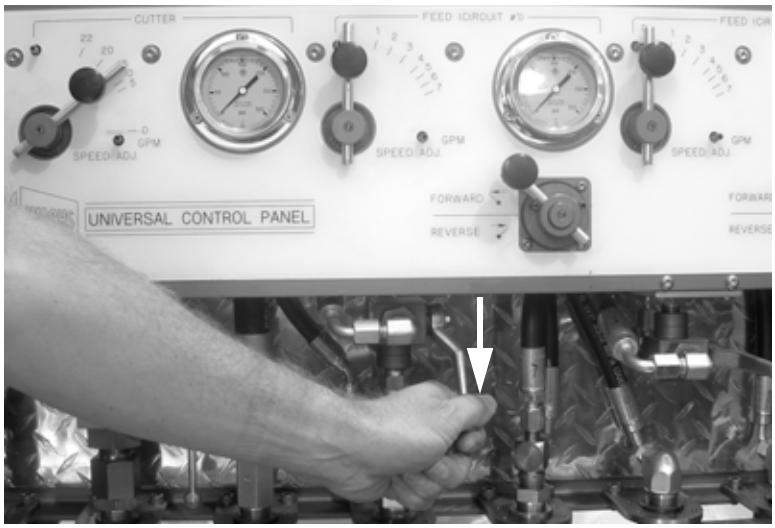



*Figure 3-45. Engage the Feed drive by pushing the Feed Circuit #1 flow lever down.*

9. Set the Feed Circuit #1 speed control to the desired feed flow level.

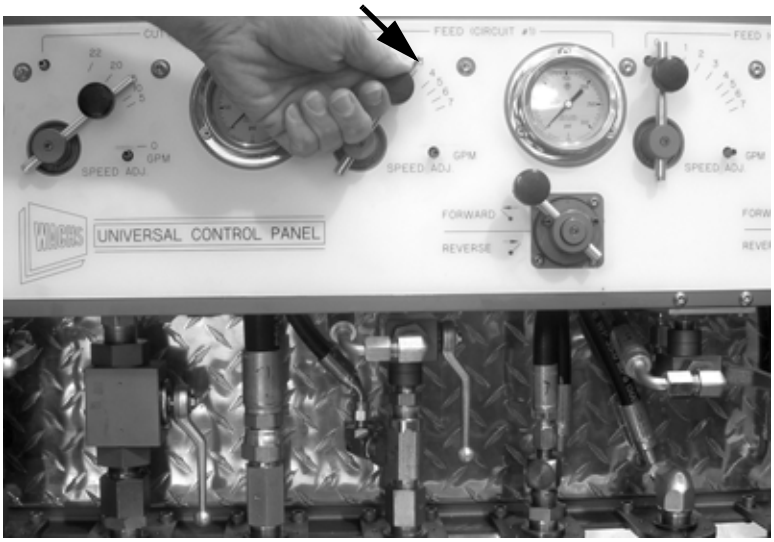



*Figure 3-46. Set the Feed Circuit #1 speed control to about 2-3 gpm.*

10. Visually monitor the feed speed as the tool cuts the pipe, and adjust the speed as necessary.

11. When drilling is finished, set the Feed Circuit #1 speed control back to 0.

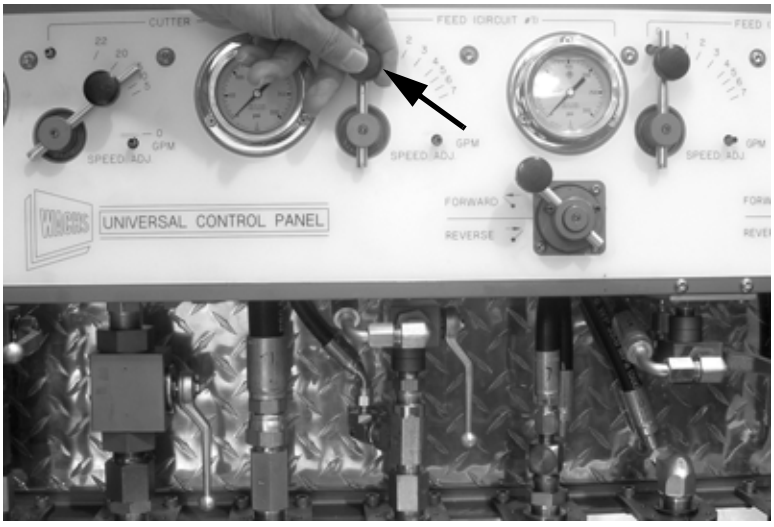



*Figure 3-47. When finished drilling, set the Feed Circuit #1 speed control back to 0.*

12. Pull the Feed Circuit #1 flow lever up to close it.

**NOTE**

A feed flow of 2-3 gpm is recommended for most operations. Setting the feed higher may reduce flow to the cutter (spindle) drive and cause the drill to stall.

**NOTE**

If the feed drive reaches the end of travel, or if the tool load becomes too high, the clutch on the feed drive will trip out and the drill will stop feeding.

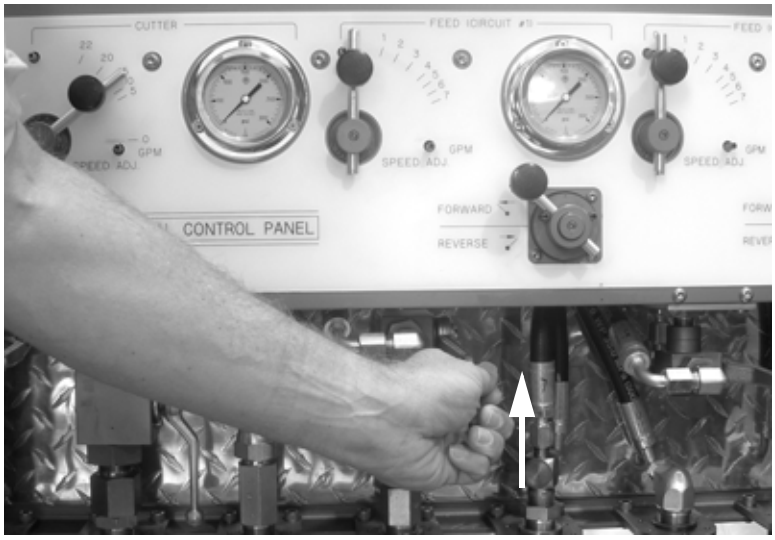



*Figure 3-48. Pull the Feed Circuit #1 flow lever back up to shut off the flow.*

13. Set the Feed Circuit #1 direction lever to REVERSE.

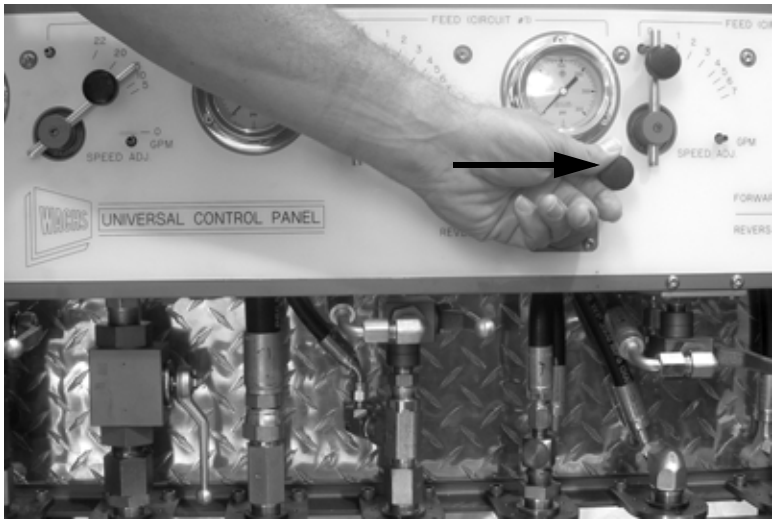



*Figure 3-49. To retract the feed drive, change the Feed Circuit #1 direction lever to REVERSE.*

14. Push the Feed Circuit #1 flow lever down to open it.

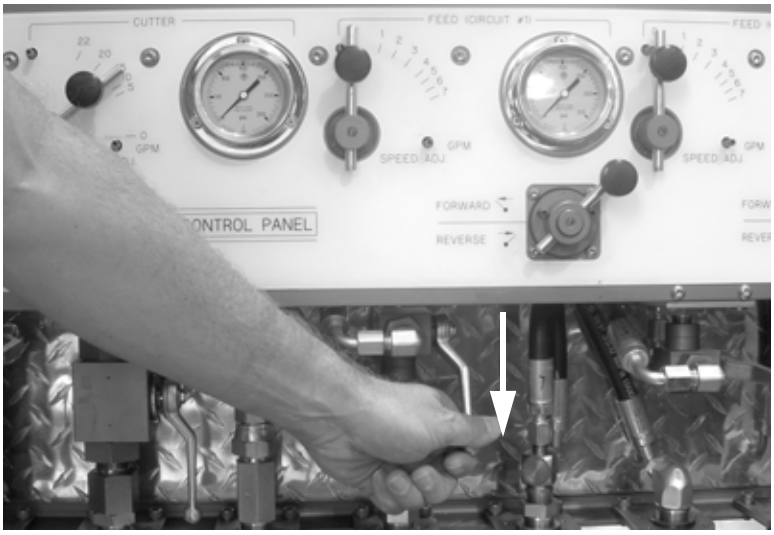



*Figure 3-50. Push the Feed Circuit #1 flow lever down to open the circuit.*

15. Set the Feed Circuit #1 speed control to the maximum speed possible to retract the tool out of the workpiece. Visually monitor the drill feed to make sure it is retracting.

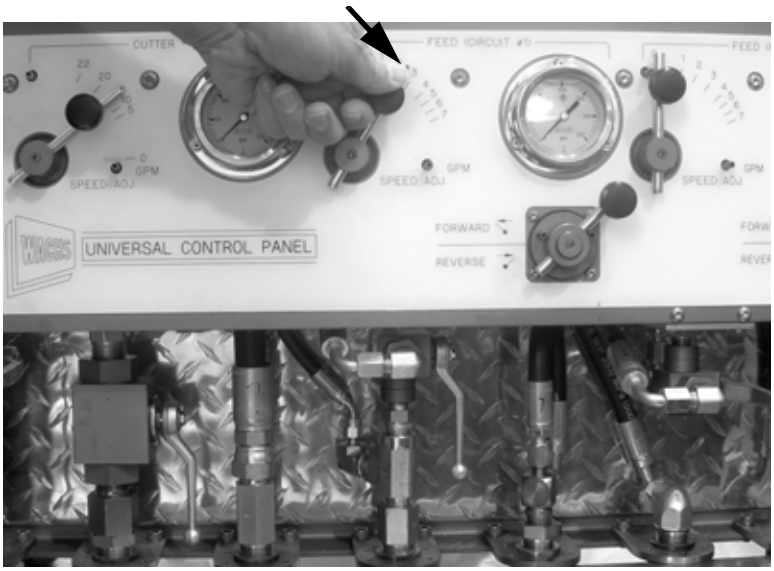



*Figure 3-51. Set the Feed Circuit #1 speed control to the desired speed to retract the feed drive.*

16. When the tool is fully retracted, set the Feed Circuit #1 speed control to 0.

**NOTE**

Leave the Cutter drive engaged with the spindle turning while retracting the feed drive. This will keep the tool from binding in the workpiece.

**NOTE**

Setting the feed speed too high may stall the cutter drive. Increase the feed speed gradually while retracting the drive and monitor the spindle rotation.

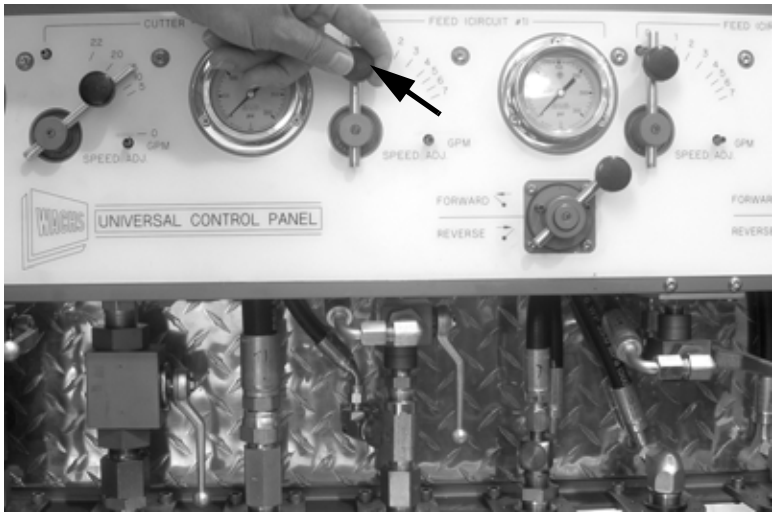



*Figure 3-52. After retracting the feed drive, set the Feed Circuit #2 speed control back to 0.*

17. Pull the Feed Circuit #1 flow lever up to close it.

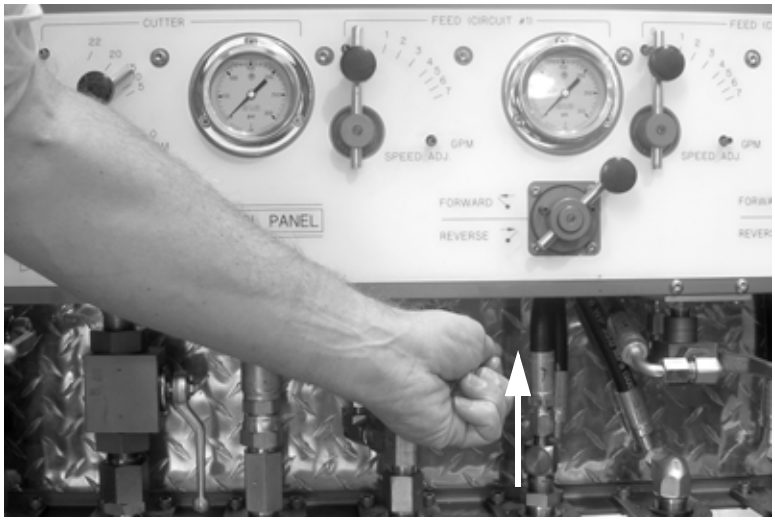



*Figure 3-53. Pull the Feed Circuit #1 flow lever back up to close the circuit.*

18. Set the Feed Circuit #1 direction lever back to the middle position (neutral).

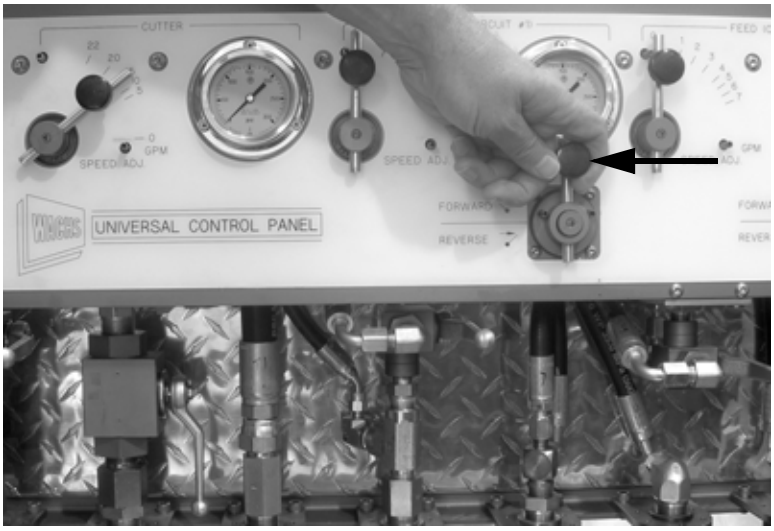



*Figure 3-54. After shutting off the feed drive, change the Feed Circuit #1 direction lever to the middle (neutral) position.*

19. Set the Cutter speed control to 0.

*Figure 3-55. Set the Cutter flow speed back to 0.*

20. Pull the Cutter flow lever up to close it.

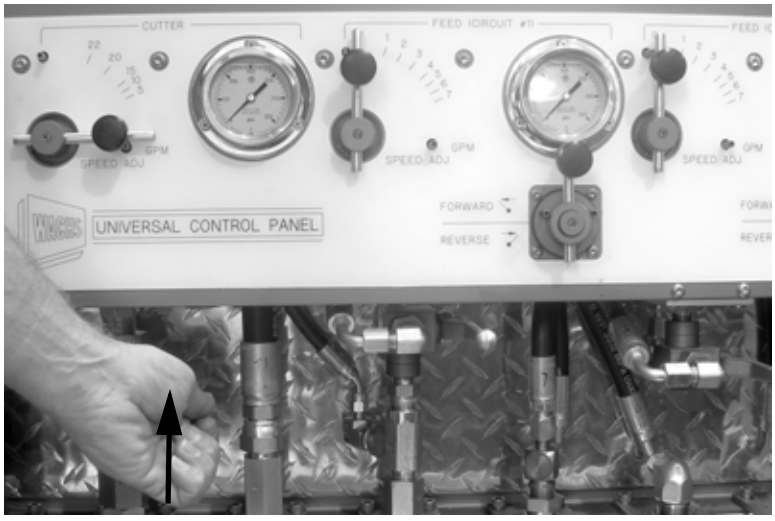



*Figure 3-56. Pull the Cutter circuit flow lever back up to close the circuit.*

21. Turn off the HPU.

### Using Manual Feed

You can feed the drill manually using the manual feed handle. Remove the hydraulic feed motor and install the handle using the instructions in “Installing the Manual Feed Handle” earlier in this chapter.

Operate the cutter drive on the TCU as described in the previous section to engage the spindle. With the spindle turning, turn the manual feed handle **counter-clockwise** to feed the tool into the workpiece.

Retract the tool fully out of the workpiece before shutting off the Cutter drive at the TCU.

## REMOVING THE DRILL

If you are using the drill out of water, you can remove the hydraulic hoses first to make it easier to uninstall it.

1. Raise the lifting device enough to put tension on the straps holding the drill.

2. Operate the cable hoist to loosen the cable around the pipe. Use the ratchet switch and trigger on the hoist to back up the spool and loosen the cable.

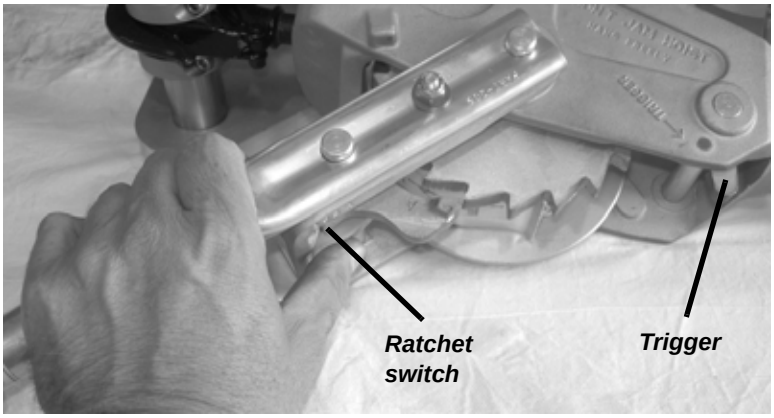



*Figure 3-57. Use the ratchet switch and trigger to release the hoist and loosen the cable.*

3. Remove both of the cable hooks from the eyes on the mounting fixture.

4. Operate the cable hoist to wind up the cable.

5. Lift the drill away from the pipe and move it to the next drilling position or to its storage location.

6. If you are finished drilling, secure the cable hoist in its "parked" position.

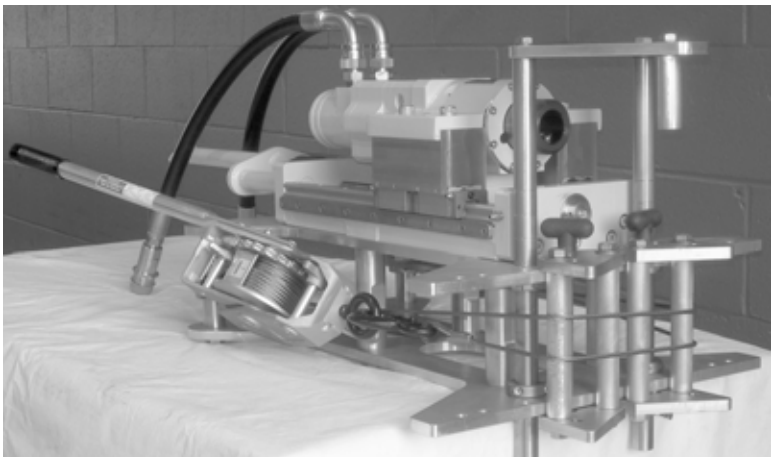


*Figure 3-58. The drill is shown with the mounting cable in the "parked" position around the fixture.*

**WARNING**

Operate the hoist slowly and check to make sure the drill does not suddenly shift position on the pipe. Sudden movement of the drill could cause serious injury.

# Chapter 4
# Maintenance

**In This Chapter**

LUBRICATION

## LUBRICATION

There are eight grease fittings on the drill that you should lubricate every time you use it:

- 2 fittings on each side of the feed slides (4 total)
- 1 fitting at the end of the feed screw
- 3 fittings on the autofeed system.

These fittings are shown in Figure 4-1 and Figure 4-2.

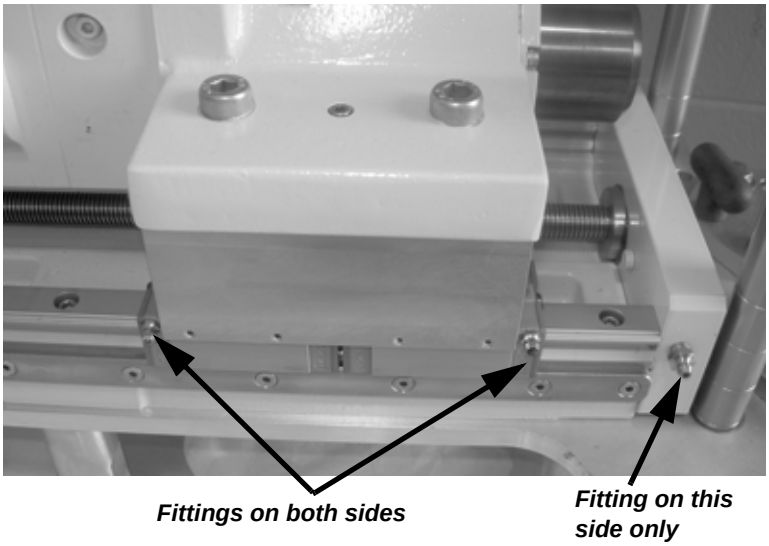



*Figure 4-1. Lubricate both fittings on both sides of the feed rail, and the fitting on the end of the feed screw.*

**NOTE**

Use an NLGI grade 2 marine grease for all lubrication of the PowerDrill.

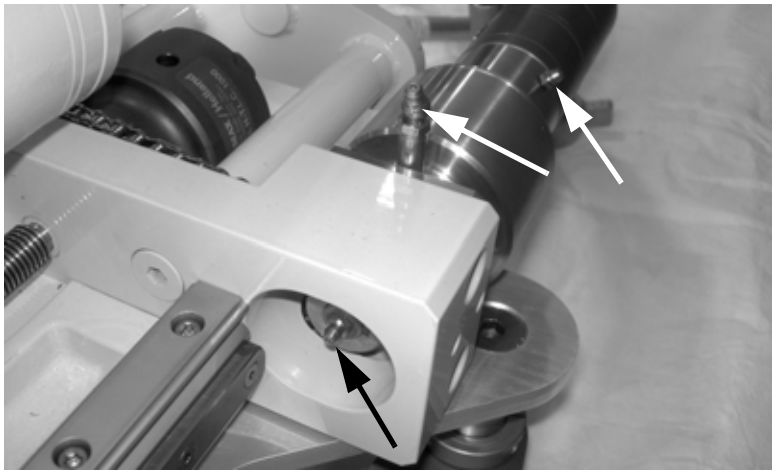


*Figure 4-2. Lubricate the three fittings on the auto-feed system.*

You will also need to remove grease plugs in the gearbox and spindle assembly to apply grease to those components.

**NOTE**

Check the grease in the spindle and gearbox every 100 hours of operation, and add grease if necessary.

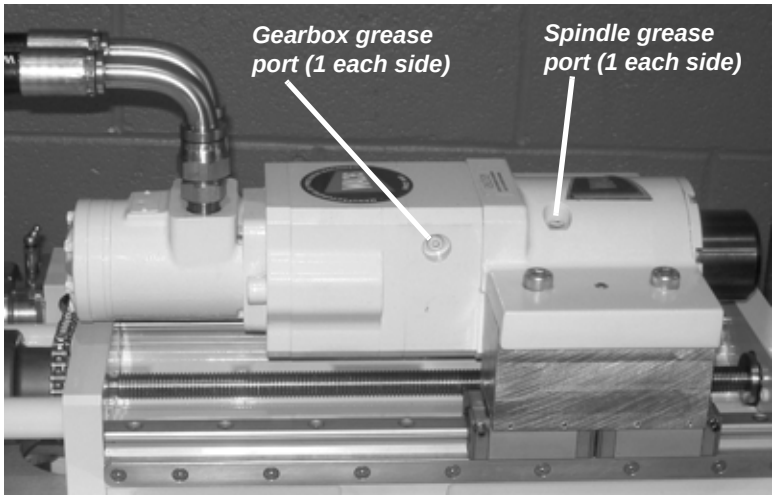



*Figure 4-3. To grease the gearbox and spindle, remove the plugs on both sides, then apply grease through one port until it starts to come out on the other side. Replace the plugs.*

## REPLACING RAIL WIPERS

Newer model subsea PowerDrills may have rail wipers on the feed slides. These wipers will wear and occasionally

need to be replaced. If residue is building up on the feed rails, replace the wipers.

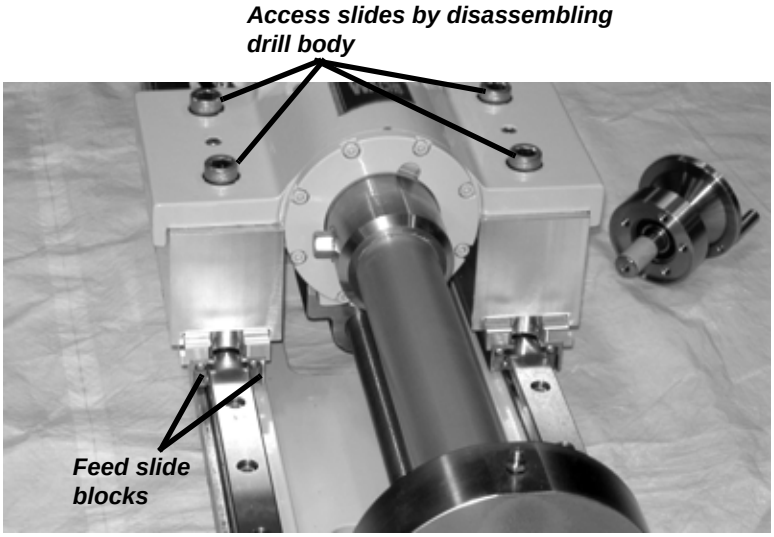



*Figure 4-4. The wipers are on the ends of the feed slide blocks. Remove the blocks by disassembling the drill body from the top.*

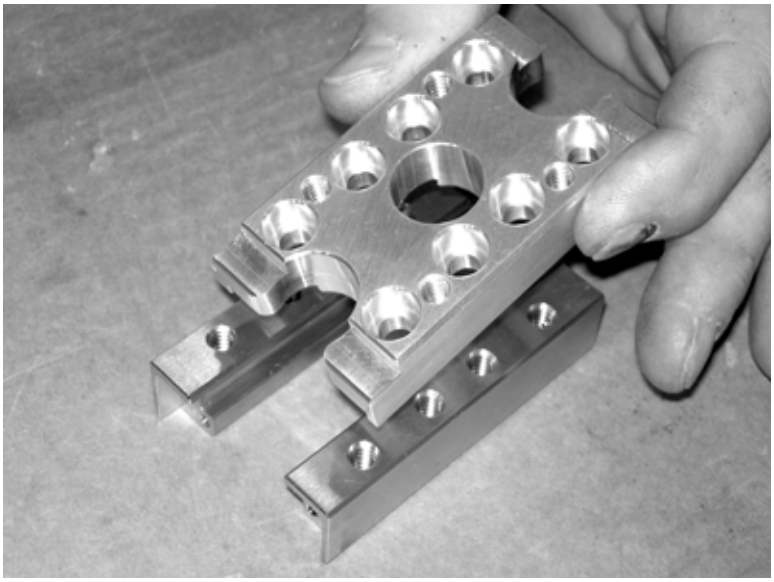


*Figure 4-5. Disassemble the feed slides to remove the blocks from the feed rails.*

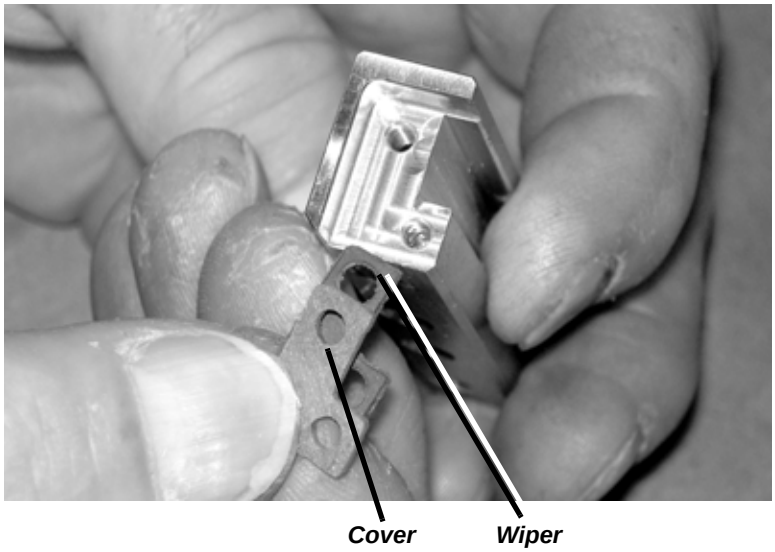



*Figure 4-6. Arrange the wiper and cover as shown, then attach them to the block using the two provided screws.*

Inspect the inside surface of the slide block for wear. If the drill body chatters during operation, or if you can feel side-to-side play between the drill assembly and the feed rails, replace the worn slide blocks.

# Chapter 5

# Parts List and Ordering Information

**In This Chapter**

ORDERING INFORMATION

DRAWINGS AND PARTS LISTS

## ORDERING INFORMATION

To place an order, request service, or get more detailed information on any E.H. Wachs products, call us at one of the following numbers:

| | |
|---|---|
| U.S. | 800-323-8185 |
| International: | 847-537-8800 |

You can also visit our Web site at:

www.ehwachs.com

### Ordering Replacement Parts

When ordering parts, refer to the parts lists in this chapter. Please provide the part description and part number for all parts you are ordering.

### Repair Information

Please call us for an authorization number before returning any equipment for repair or factory service. We will advise you of shipping and handling. When you send the equipment, please include the following information:

- Your name/company name
- Your address
- Your phone number

- A description of the problem or the work to be done.

Before we perform any repair, we will estimate the work and inform you of the cost and the time to complete it.

### Warranty Information

Enclosed with the manual is a warranty card. Please fill out the registration card and return to E.H. Wachs. Retain the owner's registration record and warranty card for your information.

### Return Goods Address

Return equipment for repair to the following address.

E.H. Wachs
600 Knightsbridge Parkway
Lincolnshire, Illinois 60069 USA

## DRAWINGS AND PARTS LISTS

The following pages include exploded view drawings with parts lists for all of the PowerDrill components.